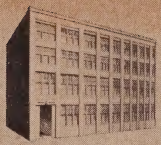
the CORNELL-DUBILIER Capacitor



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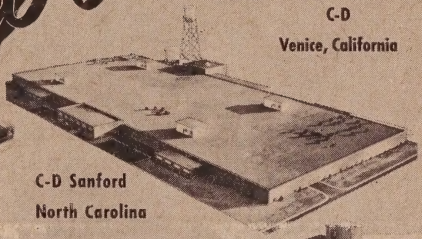

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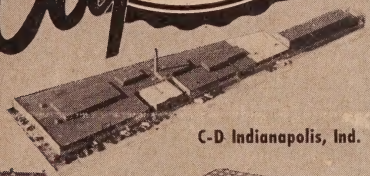

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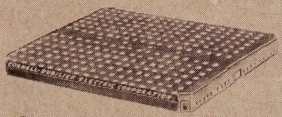

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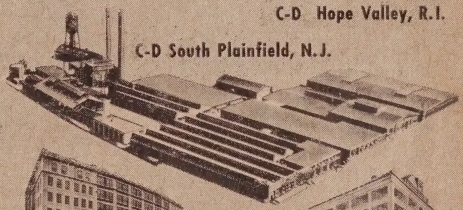
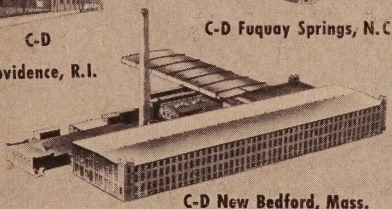


C-D South Plainfield, N.J.



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Vol. 21 MARCH, 1956 No. 3

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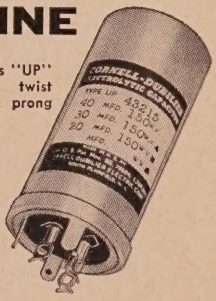

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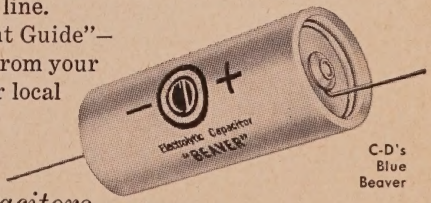

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A SIMPLIFIED RC NETWORK SYNTHESIZER

Circuits embodying various combinations of resistance and capacitance find wide application in electronics. By utilizing the relation of capacitive reactance to resistance within a selected range of operating frequencies, relatively simple capacitor-resistor arrangements can be made to perform many important and ingenious functions, including low pass, high pass, bandpass, band suppression, emphasis, de-emphasis, integration, differentiation, notching, peaking, attenuation, tone control, and analog computing.

Laboratory work with RC circuits generally takes one or all of three experimental forms: (1) checking the results of network calculations, (2) determining empirically the best R and C values for a desired performance, and (3) determining the correspondence of actual to calculated performance when capacitors and resistors of commercial tolerance are employed. In rapid testing operations, the experimental RC circuits usually are assembled on the bench from individual resistors and capacitors or from a suitable combination of R and C decade boxes. When frequent RC experimentation is usual, as often is the case in busy circuit laboratories, a permanent resistance-capacitance "board" for quickly assembling all types of RC circuits is invaluable. Such a board, or "synthesizer," is extremely useful also in teaching, both as an exercise apparatus in the laboratory and as a demonstration device in the lecture room.

The first problem in the design of an RC network synthesizer of this type is the decision as to resistance and capacitance coverage. Without discipline, one leaps quickly to the conclusion that to be adaptable to any conceivable problem, all possible R and C values must be covered. This, of course, would lead to a board of

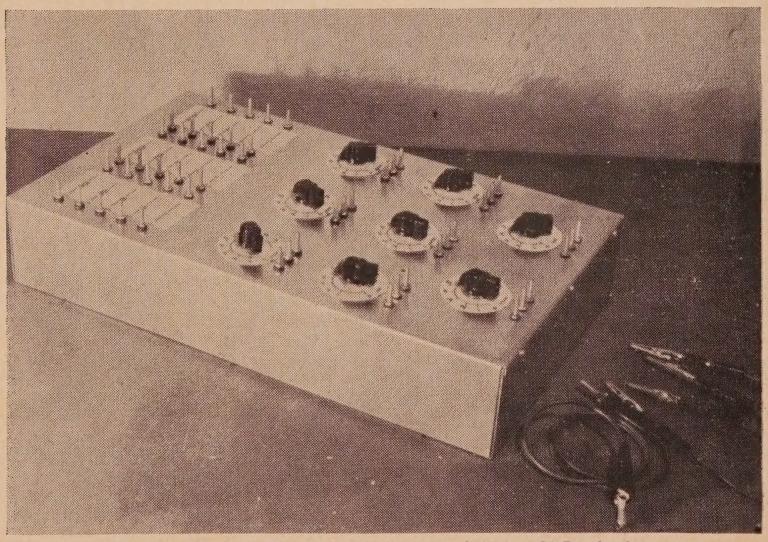

Fig. 1. Over-all View of the Completed Network Synthesizer.

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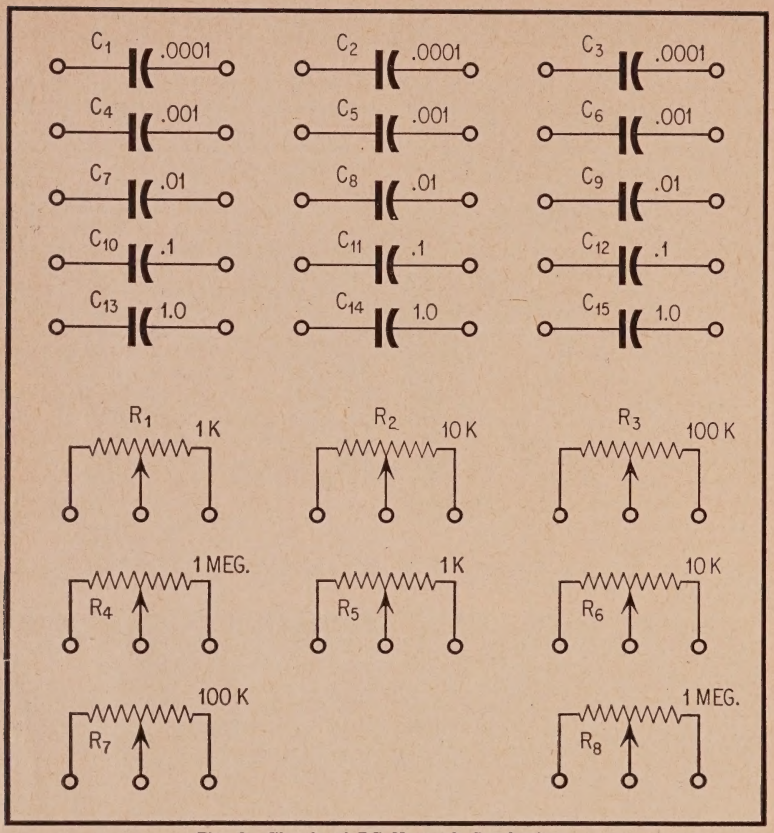


Fig. 2. Circuit of RC Network Synthesizer.

unwieldy size having such high distributed capacitance as to offer little accuracy. A compromise must be reached in number and range of components, so that practical RC circuits of all types may be set up on a board containing the minimum of components.

The second problem concerns the manner in which the circuits are to be assembled and disassembled. At first, internal switching seems attractive. But this is negated when the complexity is considered of switching say from a multi-section low-pass filter to a parallel-T network, Maxwell bridge, or phase shifter. Rotary selector switches for the purpose would become unnecessarily complicated and even if tolerated, would limit the board only to the few circuits provided for by the switching.

This leaves the **free-point** system as the most desirable arrangement. In this scheme, patch cords are connected between the R and C components to set up any type of circuit visualized by the operator. This arrangement has

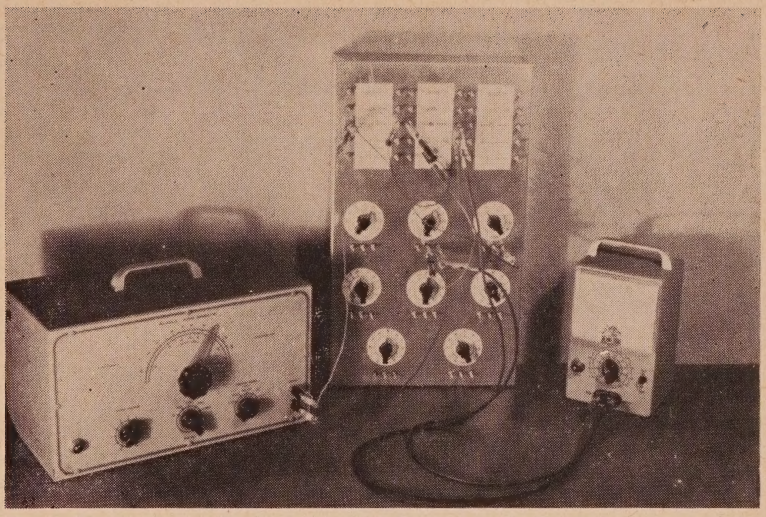


Fig. 3. Synthesizer Set Up as a Bridged-T Network, with Audio Generator and A-C VT Voltmeter Connected for Performance Checks. See Fig. 5 for Circuit.

none of the complexities of internal switching. Since the leads between components always are in sight, the circuit is readily visible, changes can be made quickly and easily, and student demonstrations become more meaningful. Finally, the circuit can be disassembled quickly at the conclusion of an experiment simply by pulling out the patch cords.

Practical Synthesizer

Figure 1 shows a practical RC network synthesizer designed for patch cord operation. The circuit is given in Figure 2.

After studying a variety of RC circuits and the R and C values needed in the frequency range 20 cycles to 100 kc, it was decided to provide three identical groups of capacitors, each group containing the following capacitance values: 0.0001, 0.001, 0.01, 0.1, and 1.0 microfarad. (See C_1 to C_{13}, C_2 to C_{14}, and C_3 to C_{15} in Figure 2.) Also, two identical groups of small volume control-type potentiometers (with direct-reading resistance dials) are provided, each group containing 1 each 1000 ohms, 10,000 ohms, 100,000 ohms, and 1 megohm. (See R_1 to R_4, and R_5 to R_8 in Figure 2.) At various settings, these potentiometers will provide a wide variety of resistance values usable in RC circuits.

Each of the three terminals of each potentiometer is accessible at a panel terminal. Each of the two terminals of each capacitor likewise is accessible at a panel terminal. See Figure 2. Circuits are set up by running patch cords or clip leads between these various panel terminals.

There are several methods of mechanical assembly of the synthesizer board. Binding posts or banana jacks might be used for the 54 panel terminals. This is a neat arrangement, but it is not possible to stack inexpensive plugs at a single jack when several connections are to be made to one terminal. Furthermore, the more than four dozen posts or jacks would represent a sizeable cost. The Editors' decision was to employ as terminals, 3/4-inch/6-32 screws insulated from the

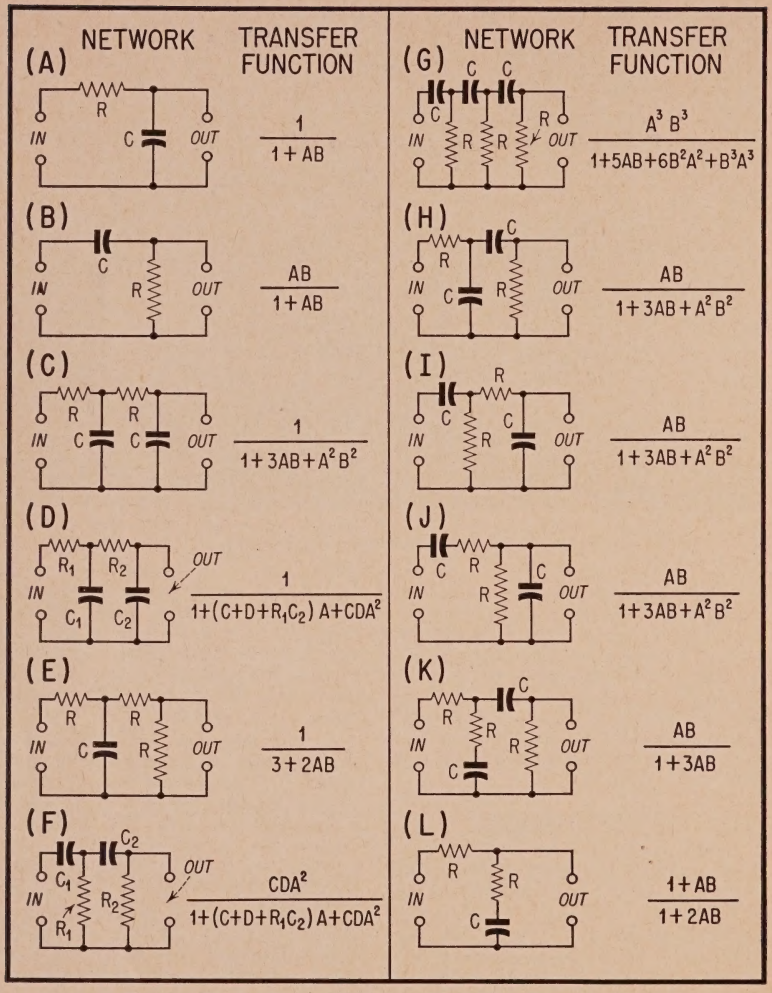


Fig. 4. Typical Networks Obtainable with the Synthesizer.

metal chassis on which the synthesizer is built by fiber washers (one shoulder-type and one flat-type for each screw). A double advantage is obtained from the use of these screws. First, the screws are long enough to allow a number of leads to be clipped simultaneously to each screw; or, if semi-permanent connections are desired, a number of nuts may be threaded onto each screw to grip spade lugs on the ends of leads. Second, the screws,

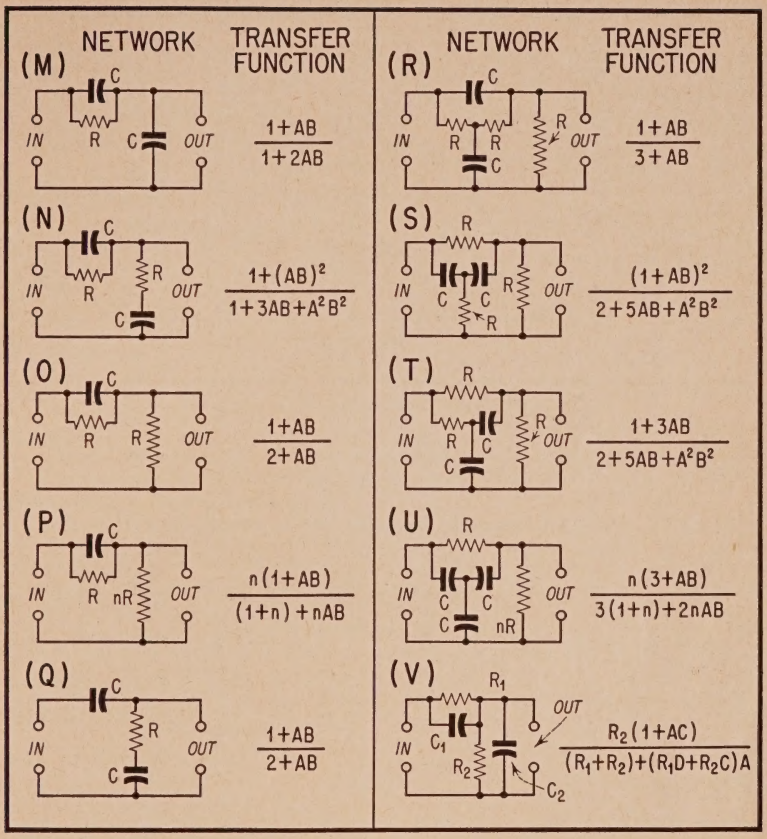


Fig. 4. Continued.

nuts, and insulating washers are inexpensive. The construction is shown clearly in Figure 1.

Each potentiometer is provided with a direct-reading ohms scale. These are seen in Figures 1 and 3. Each scale is prepared in the simple manner of setting the potentiometer to a number of predetermined resistance values, as indicated by a resistance bridge or good ohmmeter, and marking the corresponding values on the scale. For example, the 1000-ohm potentiometer would be set successively to 100, 200, 300, 400, 500, 600, 700, 800, 900 and 1000 ohms and also at as many points as possible between these values. The clockwise scales seen in Figures 1 and 3 are direct reading when connections are made to the center and right-hand panel terminals of the potentiometers.

As shown in the accompanying photographs, the synthesizer is built on an enclosed aluminum chassis, 17″ long, 10″ wide, and 3″ deep (LMB

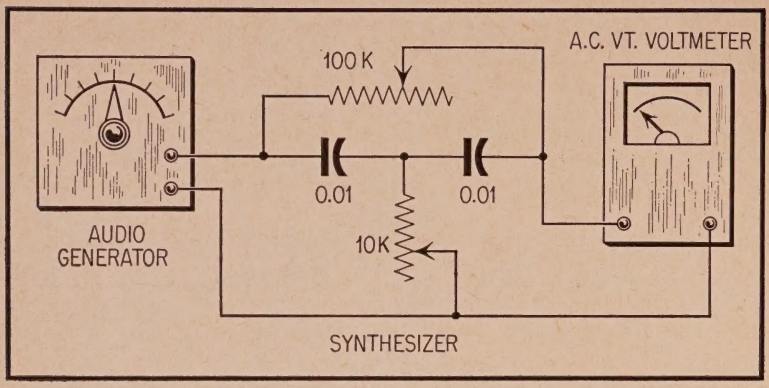


Fig. 5. Bridged-T Network set up in Figure 3.

No. 22). Some experimenters might prefer to use a plastic panel instead of the metal chassis.

Depending upon the accuracy with which the potentiometers are calibrated, the accuracy of the synthesizer may be taken to be as good as that of the commercial resistors and capacitors which normally will be used in the final circuit developed from the experiments.

Figure 3 shows the synthesizer, with clip leads setting up a bridged-T network (See Fig. 5), connected to an audio generator and v-t voltmeter for performance tests.

Typical RC Networks

It has been said that RC circuits are as numerous as the imagination can conceive. There certainly are many possibilities.

Figure 4 shows 22 typical RC combinations. These are in addition to such well-known arrangements as the Wien bridge and other impedance bridges, simple T, and Twin-T. With each circuit is given its **transfer function.** This is the ratio of output to input voltage. In the expressions for transfer function, $A = j(6.28f)$, $B = RC$, $C = R_1C_1$, $D = R_2C_2$, and n = a positive multiplier. C is expressed in farads, f in cycles per second, and R in ohms.

Additional data on RC circuits, their characteristics and applications may be found in the following issues of the C-D CAPACITOR: February, 1949; November, 1951; March, 1952; November, 1952; March, 1953; and September, 1954.

PARTS LIST FOR FIGURE 2

C_1, C_2, C_3 — 0.0001 ufd silvered mica, C-D Type 5R5T1

C_4, C_5, C_6 — 0.001 ufd silvered mica, C-D Type 1R5D1

C_7, C_8, C_9 — 0.01 ufd silvered mica, C-D Type 1DR3S1

C_{10}, C_{11}, C_{12} — 0.1 ufd plastic tubular, C-D Type PJ-4P1

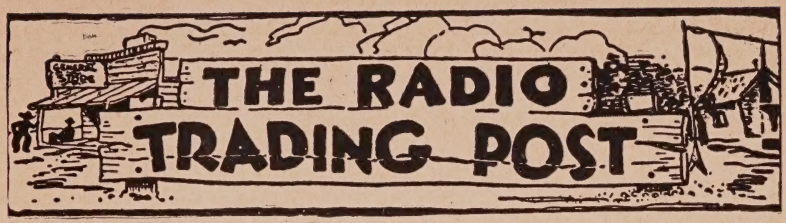
C_{13}, C_{14}, C_{15} — 1 ufd 400 v plastic tubular, C-D Type PJ-4W1

R_1, R_5 — 1000-ohm wirewound potentiometers, I. R. C. Type W1000

R_2, R_6 — 10,000-ohm wirewound potentiometers, I.R.C. Type W10,000

R_3, R_7 — 100,000-ohm linear-taper potentiometers, I.R.C. Type Q11-128

R_4, R_8 — 1-megohm potentiometers, I. R. C. Type Q11-137 (linear taper) or Q13-137 (Log taper)



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WANTED — 160, 80, 40, and 20-meter coils, for Hallicrafters HT-9 xmitter, either complete or partial set. Cash. George T. Mitchell, 1310 33rd South, Seattle 44, Wash.

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SELL OR SWAP — 2 AM Police mobile transmitters; ant. SW bridge; Electronic Mon-Key; 40 and 20 meter ant. mobile coils; Command xmitters. Can use ham gear. William E. Barrett, 2828 S. 9th., Sheboygan, Wis.

SELL — Elmac PMR 6A mobile rcvr. and power supply, $125; Babcock MT5A xmitter less power pack, $75; SX71 and speaker, $169; Collins 32V1 TVI'd, $350; Precision E-200-C sig. gen., $35; Heathkit TS-3 TV gen., $45. Mark Martinmaki, Calumet, Mich.

WANTED — Surplus tubes and radio-TV parts, in original cartons; Sams photofacts. State cond. and prices first letter. C. T. Trinka, 815 Central Ave., Hamilton, Ohio.

WANTED — For cash Hickok 680 RF marker and crystal calibrator; Hickok 675 scope. Have Howard model 482 FM tuner. Don M. Lidenton, 701 Poplar St., Poplar Bluff, Mo.

WANT — Radio Amateurs Handbook 1950 and later; Terman, Fink, Henney, Hand, Everitt, Dow, Radiotron Designers Handbooks and Communication texts. Will trade 1. n. radio tubes. Bob Boener, 949 Rosewood, Inglewood, Calif.

FOR SALE — All Eldico: Tr-75-TV; AM-40; VFO-2. Good cond., complete, with 80 meter coil, less mike, ready to operate, $135, or best offer. Jerome C. Squillaro, R3, Box 304, Bangor, Pa.

WANT — Leece-Neville 12 v. alternator, regulator, and rectifier; TV camera; Aqualung; RC equip. Trade 813's, 810's, RG8U & RG58U, Philotuner, Mallory UHF converters, xmitter dynamotors. Ace TV Co., Box 2945, Tampa, Fla.

WANTED — Antenna coil for RCA 9K2, 12879. George W. Riddle, 15 George St., Milford, N. H.

FOR SALE — Like new Heathkit multimeter model MM-1, completely wired, perfect operating cond., $25 COD. Morris Wilson, Vermontville, Mich.

FOR SALE — Hickok 610A sweep gen. and marker, good cond., best offer. H. A. Johnson, 8218 Tenth Ave., Brooklyn 28, N. Y.

FOR SALE — Hard to get types of radio tubes. Write for list. Anderson's Radio Service, 44B Limestone St., Caribou, Me.

TRADE — $2,700 worth of transmitting Equip., for chemical lab or physics equip., microscope equip., telescope. J. N. Cryer, Jr., Box 53, Natchitoches, La.

TRADE — FD12 FM frequency and modulation monitor for National NC 300 rcvr. l. n., original packing. L. Keene, 3423 Edgewood, Ann Arbor, Mich.

SWAP — Federal 160 3-wire surface boxes, Heinemann circuit breaker, Trumbull 30 amp 2 pole fusible switch, Remington model 10 noiseless typewriter. Want TV and audio supplies, equip. L. Walter, 24 Carlton Terr., Rutherford, N. J.

WANTED — Gonset converter 3-30 mc. and TP400 tube in good shape. Cash or trade. C. F. Albertoni, 2629 Paxton Ave., Akron 12, Ohio.

SELL OR TRADE — Radio-TV test equip., mostly Heath and Eico; also tubes, parts books, for power tools or what have you? Herbert E. Pence, 311 So. 3rd St., Attalla, Ala.

WANTED — Complete Hi-Fi setup, in top shape. Prefer name brand. Send full info as to age, make, model, and price. Paul P. Harris, 3448 S. Archer Ave., Chicago 8, Ill.

FOR SALE — Vibrator xmitter power supply, 450 v. at 160 ma. plus 270 v. at 40 ma., 6 or 12 v. input, perfect, $20. Louis E. Brown, 2115 Melbourne, Dallas 24, Tex.

SELL OR SWAP — Riders 5, 6, and 7, good cond., $14, or trade for Heath GDO or antenna rotator plus cash. Bryan Hall, DeKalb, Tex.

WANTED — Radio & TV repair shop (prefer one man). State full details concerning equip., locality and price — no blue skies please. M. Horawa, 1741 E. Eubanks, Oklahoma City 11, Okla.

SELL OR TRADE — Motorola portable 7½" TV, model 7VT5R, in leather travel case; Anchor TV booster model ARC-101-50 to match, neither ever serviced. Want Chicago Tech. Insti. Electrical Drafting course. Warren S. Gilman, Winter St., Tilton, N. H.

FOR SALE — Lab. type tube tester, custombilt model, recently factory remodeled for ten years. Sacrifice for $100. John W. Martin, Box 847, Anaconda, Mont.

FOR SALE — KW final for 4-125A's; exciter with self contained VFO; speech amplifier with clipper — separate or as a group for less than cost of parts alone. F. J. Kern, 50 Shelburne Rd., Springfield, Del. County, Pa.

FOR SALE — UTC driver xformers LS-21, $5 each; also UTC LS-72 and CG428-250 ma. power and bias xformers and others, all unused. William Kalish, 687 Center Rd., Eastmeadow, L. I., N. Y.

WANTED — Instruction manual for Triumph Oscillograph Wobbulator model 830, either commercial or Navy manual, cash. W. H. Fishback, Old Comers Rd., Chatham, Mass.

FOR SALE — Six flush type WE telephones, equipped with F1 handset, F1 xmitter, AH1 rcvr., G1 handset mounting, and special plate adapting components to flush mounting, $10 each, FOB. Emil Backstrom, Jr., 6 Pel Place, Pelham, N. Y.

FOR SALE — Heath AT-1 xmitter, A-1 cond., $25, plus post.; min. 2-tube FM radio, needs new tubes and batteries, $3 postpaid; 1/30 hp motor, $4 postpaid. Charles Knowlton, Warren St., Upton, Mass.

FOR SALE — West. Elec. 226-D ship-to-shore radio telephone, may be seen on request. Any reasonable offer considered. William M. Collings, 5 Johnson Rd., Arlington, Mass.

SELL OR TRADE — NRI xmitter, partly disassembled, but complete with schematic; also meter, front panel, chassis, and schematic for NRI multitester. Want first edition of "Oahspe." Glen Ward, 610 Fillmore St., Taft, Calif.

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WANTED — Three-piece plastic (any color) case only for model 149 Emerson 5-tube pre-war radio. Will sell Solovox. Tritchler, 293 W. 7th St., St. Paul 2, Minn.

FOR SALE — Emerson 12½ TV chassis, complete and working, $25; Eico 232 VTVM, l. n., factory calibrated, $35. H. Bell, 3917 Ely Ave., New York 66, N. Y.

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TRADE OR SELL — Unused National SW-54 for good Geiger counter or higher priced rcvr. and pay difference or sell outright. Charles E. Keinath, 38 Prospect St., Newark, Ohio.

WANTED — Unused Tubes: 6A8, 14Q7, 12X4, 6BQ7A, 6BQ6GTB, 6SN7GTB, 6T8, 3525, W4, 50-L6, -C5, -B5, 6AU6, also UHF converters and Ch. 17 and 59 strips. Ben Mueller, Box 401, Sanborn, N. Y.

FOR SALE — Standard tube checker, gen., oscillator, scope, Riders manuals. Bases FOB discount. National Radio Service, 594 Larkin St., SW Apt. 567, Atlanta 14, Ga.

WANTED — SX25 super-defiant Hallicrafter radio receiving set, preferably with speaker, in good condition. State minimum price acceptable. David Landesberg, 179 Marcy Ave., Brooklyn 11, N. Y.

WANTED — Complete oscillator and RF coil and switch assemblies for BC-348J, Q or N; RME 55-C Mobile converter. Advise cond. and price. E. B. Blett; 19176 Forrer, Detroit 35, Mich.

WANTED — Crystal Calibrator and Monitor type CGQ-60133 or similar model; Lampkin or equiv., frequency measuring instruments. All models covering 1-500 mc. considered. Murray Cohen, 2078 Wallace Ave., New York 62, N. Y.

FOR SALE — Unused PE-103 complete with cables and spare brushes as rec'd in overseas crate. Also power receptacle plug and spare 6 v. solenoid, $29. M. E. Lawson, 4010 River Dr., Houston 17, Texas.

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HAVE — Photofacts 1-2-4, Riders 12, Weston Master II, Coyne Applied Practical Radio (5 vol.) Want tape recorder, multigraph, or ?? L. Putnam, Woodward, Iowa.

WANTED — Old radio tubes for collection. Send information and prices. Sterling Jensen, 3976 Skillman Lane, Petaluma, Calif.

FOR SALE — 1 Ram flyback 036, l. n., $7; 2 Universal GE type flybacks, $3.75 each; Eico 320K, l. n., $12.50. William K. Lacy, 201 W. Castle St., Syracuse 5, N. Y.

SELL OR TRADE — Maico hearing aid, 10 w. Hi-Fi amplifier, unused 352 Eico TV bar gen., 40 w. modulator, 6 v., 425 v., 375 ma. dynamotor, 800 v., 275 ma. supply. Need S-38, VOM, or ??. Stan, 2748 Meade St., Detroit 12, Mich.

WANTED — Will pay cash or trade for radio or photo equip. Need power supply 12 or 24 v. input made by RMCA for Radiomarine model 8027. Northport Camera Shop, Box 300, Northport, N. Y.

FOR SALE — GI R90L recording and phono assembly in carrying case, good cond., $15. Don Lundy, 134-20-243 St., Rosedale 22, L. I., N. Y.

SWAP — Like new Rolleicord IV and Omega DII enlarger with 6⅜" Wollensac lens for good NC 183D or equiv. W.T. Clark, Frances Dr., Greenwood Hills, Harrisburg, Pa.

FREE — QST copies, other magazines on radio and TV, to shut-in. Interested in ham radio. Write for information. J. Phennicie, Jr., Box 55, Norway, Iowa.

SELL — UTC LS-10 xformers, perf. cond., postpaid anywhere in U. S. for $7 each; RCA 40D amplifier, $110. George Tate, Artillery Rd., R. 4, Taylors, S. C.

SELL OR TRADE — FM Pilot tuner; trumpet; prism binoculars; 120 bass piano accordion; 16 mm sound projector; multitester; scope; VTVM. Want 75 or 100 w. amplifier and three or four speaker units. John Arnold, Box 84, Bluffs, Ill.

WANTED — 1951 Dodge radio in good condition. Will trade over $100 worth of radio receiving tubes, parts, and service manuals. All parts and tubes in perf. cond. Prefer local. H. E. Melle, 1020 Wright Ave., Toledo 9, Ohio.

WANTED — 800 cycle motors and carbon washers for Bendix carbon pile voltage regulators. A. H. Taylor, Read Island, B. C., Canada.

FOR SALE — Riders radio manuals 1-8 and 13 and index, all $42 and express charges. Len Sporn, 14B Plesinger Pl., Apt. 34, Paterson 4, N. J.

WANTED — Technical manuals on Army, Navy and Airforce; war surplus equip. John Skane, Halifax 1, Pa.

WANTED — Jackson model TVG-2 gen. and CRO-2 scope. State cond. and price. Lucien Michand, 303 Beleire St., New Bedford, Mass.

FOR SALE — Eico 360 TV sweep gen., $20; University 6201 speaker, $35, in bass reflex cabinet, $45. Local preferred. Martin A. Weiner, 2927 Holland Ave., New York 67, N. Y.

FOR SALE — RCA WV97A voltohmyst 6 months old, $45; Heath 0-9 scope, $45; Supreme 589A tubechecker, $25. All in perfect cond. Paul Richter, 1446 Webster Ave., Bronx 56, N. Y.

SELL OR SWAP — CBS UHF converters, $18; DG7 Detection Geiger counter with external probe, $89; Eico Geiger counter, $21.50. All perfect, complete, with new batteries and warranty. F. P. Silver, 897 Scott Rd., Dickson City, Pa.

SELL OR SWAP — NRI TV advanced course kits; Eico 5" scope and probes; first 28 books of ICS Electrical Engineering course in 2 heavy binders; '42 Buick radio; Warners Electroplating book. A. A. Marchegiano, 1734 Johnston St., Philadelphia 45, Pa.

FOR SALE — Eico 5" scope model 425 with RF probe, $30 and 315 sig. gen., $25. Local only. Herbert Spilger, 1001 Anderson Ave., Bronx 52, N. Y.

WANTED — Hallicrafter S-37, two-way radios; Lampkin or Measurement Corp. equip. Sell or trade Motorola 152-172 mc., 6 v., rcvr. and xmitter. R. Phillips, 1312 McGee, Kansas City, Mo.

WANTED — Good used tape recorder. State cond., make, model, and price. Peter Canup, R-2, Gainesville, Ga.

WANTED — New or rebuilt 8BP4 picture tube. Myles Suffecool, 418 Belden Ave. NE, Canton 4, Ohio.

SELL OR TRADE — Back issues of C-D Capacitor; Metal Locator; books on do-it-yourself; craft books; Sign Painters' letter patterns. Want transistors and small parts for same. John Haynes, Doe Run, Mo.

FOR SALE — Heavy duty mobile antenna mounts body mount type, $4. Walt Gately, 122 Wessington Ave., Garfield, N. J.

FOR SALE — Hickok model 534 Dynamic Mutual Conductance Multi-Tester, exc. cond. Make offer. R. Galen, 7243 Camellia Ave., North Hollywood, Calif.

WANTED — Two unused IRC type D controls for cash. H. D. Vorhauer, Chincoteague, Va.

FOR SALE — Hickok 277X sig. gen., $125 and Hickok 209A VTVM, $100. Both l. n. Sig Salmento, 616 Peaks St., Bedford, Va.

FOR SALE — Heathkit VTVM V4A assembled by professional wireman, including fused plug, DC isolating probe, complete assembly and instruction, perf. operating cond., $30 FOB. Wm. Levine, 216-69 68 Ave., Bayside 64, L. I., N. Y.

WANT — A 6P7 tube; have xmitter, rcvrs, tubes. C. Fernandez, 81 Warren St., Roxbury, Mass.

WANTED — Unassembled Heathkit model A-9B, A-7D or similar Heathkit. Stanley Buckwalter, 61-41 Saunders St., Rego Park 74, N. Y.

FOR SALE — Exc. cond., BC-610 xmitter; speech amplifier cables, final tank coils, antenna relay, $450 plus shipping. M. Freedman, 144-34 72 Drive, Flushing, L. I., N. Y.

FOR SALE — 1956 Webcor model 2611 tape recorder, l. n., $160; Brownie movie camera, 2.7 lens, $29; custom auto radio for '54 Mercury; $35, for '54 Ford, $45. Joseph Codzisz, 2509 Pine Ave., Niagara Falls, N. Y.

FOR SALE — Voltohmist Master WV-87A, complete, original factory carton, l. n., $35. York Marine Radio, Stonington, Conn.

FOR SALE — Books, exc. cond.; Rider's Inside Vacuum Tube, $2.25; both vols. Pix-O-Fix, $1; Audel's TV Manual, $1.25; Ghirardi's Modern Radio Servicing, $2; technical magazines-24 latest "Service Management," $2; others. E. Hoornstra, 305 Ann St,. Sault Ste. Marie, Mich.

SELL OR SWAP — Hickok AC-51 modernized tube tester, good cond., $25 or swap for good typewriter, standard or portable. Stubbs, 140 South 4th St., Reading, Pa.

FOR SALE — 1955 De Soto model 834, complete, unused, custom auto radio. M. T. Burkot, 9991 Albion Rd., North Royalton, Ohio.

SELL OR SWAP — Dumont 2740 scope, perf. cond. with manual, reasonable, or trade for VTVM and capacitor tester. Morris E. Jacobs, 371 East 179th St., Bronx 57, N. Y.

FOR SALE — Mobile power supply Mallory UP 554 with filter unit VF 223, coax cable RG 11/J and RG 59/J, oil-filled condensers. James McDaniel, 1013 La-Fayette St., Elizabeth, N. J.

FOR SALE — Philco tubes in original boxes: 5-6SQ7, 4-6SQ7GT, 6-7H7, 5-7W7, 3-6AL7GT, 2-6SL7GT. Best offer; sent COD. Stephen Barniak, 2426 Perot St., Philadelphia 30, Pa.

FOR SALE — S-40 Hallicrafters rcvr., $40. Dan DeLeon, Apt. 19, 111 Norfolk St., New York 7, N. Y.

FOR SALE — RCA 17CP4 Pix tube, l. n., $15; used RCA 21AP4 pix tube, good cond., $10. J. H. Schultz, 1225 Franklin, Springfield, Ill.

SELL OR TRADE — Surplus UHF sig. gen., 520-1300 mc., CW or pulse output, accuracy within 1%, $130, or trade for Sams Photofacts, Heathkit test equip. or ? S. Consalvo, 4905 Roanne Dr., Washington 21, D. C.

TRADE — Standard tuner coils. Have 2-7-9-11-13 in exchange for channels 3-6-10-12. J. Papovicle, Westville Electric, 216 Broadway, Westville, N. J.

TRADE — Single side band rig; 20A exciter; pr. 811A's final; VFO, power supply; slicer, for antique or classic automobile. Don Lake, 1619 Ten Eyck St., Jackson, Mich.

WANTED — Elkon model 310 (or similar) 3-amp full-wave battery charger in good cond., must be reasonable. David Friedman, 1562 E. 16th St., Brooklyn 30, N. Y.

SELL OR TRADE — BC 223; SCR610; H.O. trains and equip.; .38 cal T.A.C. 4" bbl., .22 cal rifle and scope. Need 30-40 mc.-FM (40F3) rcvr., 6 v. DC, station monitor, 110 v. AC., Lionel 027 equip. William E. Hobson, 1018 Rose Hill Ave., Hagerstown, Md.

SELL OR TRADE — Astatic channel chief booster, good cond. and working order; Solar condenser-resistor analyzer (cover needs repairs), instruction included. Want new 7P4 in carton. Cass Radio and TV, 840 Cass Ave., Kingsford, Mich.

SELL OR TRADE — TV manual No. 3, $14; Eico sig. gen. 322, $15; and VTVM 221, $20; Heathkit VTVM V-4A, $22.50; Prescision E200C sig. gen., $30. Interested in portable TV using 7 7P4 pix. K. Walls, 1119 Montello, Brockton, Mass.

SELL OR TRADE — Rider's TV 1 thru 11, $100; Heath sweep gen. $35; Eico scope, $35; Oah CRT tester, $7; many tubes, parts, ham gear, etc. Ed Enos, 18 Detroit Ave., Massapequa, L. I., N. Y.

FOR SALE — Johnson: Viking I — factory TVI kit installed — VFO and antenna Matchbox, all l. n. First offer over $235 takes all. D. M. Gallagher, 280 Mountain Ave., Berkeley Heights, N. J.

FOR SALE — Hallicrafter SX-96 (one month old) perfect cond., sacrifice for $200. M. Finelli, 1028 Jefferson Ave., Rahway, N. J.

SELL OR TRADE — Antique radio apparatus: Crosley model 51, uses 2 UX199 tubes, Magnavox audio amplifier type A1, Radiola type 33 with speaker, Japanese hand gen. 200 v. DC and 6 v. DC. J. H. Griscom, Jr., 901 Monroe St., Annapolis, Md.

WANTED — Heath audio analyzer and condenser checker, built or unbuilt, for cash or trade Win-Tronix white dot generator, perf., orig. carton, for both. Fred Butterfield, 1 Second St., Brooklawn. N. J.

SELL OR SWAP — Watch Repair Correspondence Course for electronic meters, tubes or $15 cash. Conroy Radio, 2523 W. Willard St., Phila. 29, Pa.

FOR SALE — 11 vols. Sam's Photofact and Correspondence course on Radio-TV Electronics, DeForests', $120. E. W. Lambert, 421-99th St., Niagara Falls, N. Y.

FOR SALE — Almost new TDC tape recorder; engineer-owner has made several mechanical improvements in drive system; high-quality Bell and Howell 2-speed machine, ideal for Hi-Fi enthusiasts, $150. C. W. French, 896 Huntington Ave., Boston, Mass.

FOR SALE — Heathkit: V6 VTVM with peak-to-peak probe, and S3 sig. tracer, $15 each; and scope calibrator, $5; RMS bar gen., $10 plus shipping. Robert Fellows, 90 North St., Caledonia, N. Y.

SALE OR TRADE — RME-45, Match speaker in cabinet, factory reconditioned, $85; Gonset tri-band, $32.50; wire recorder, $40; ARC-5 7 mc. trans and 5-3.5 mc. rec. mobile trans., $25; Heath 0-6 scope, perfect, $35. Floyd Bitters, RR 2, Peoria 5, Ill.

WANTED — 40-meter phone or CW xmitter, mobile or fixed station. Will trade NRI 75 meter phone xmitter, TR-4 2 meter transceiver, 500 v. AC power pack; Motorala 40 and 20 meter auto converter. J. C. Stephens, 1218 Rockville Pike, Rockville, Md.

SELL OR TRADE — Antique victrola RCA 1906 model VV-240 console, plays all speed records, hand crank; also radio and building magazines. Want cash or radio equip. Ralph Miller, 7 Lorne St., Dorchester 24, Boston, Mass.

SELL OR SWAP — Olympic 8-925 AM-FM radio with automatic record changer, in console cabinet, perf. cond. Want good dual speed tape recorder. Ely Radio, 3917 Ely Ave., Bronx 66, N. Y.

WANTED — 3" and 5" TV sets, any make and reasonable cond. State price and cond. C. W. Yock, Danube, Minn.

SELL OR TRADE — 20 w. Hi-Fi system: Garrard changer, mahogany base, 45 rpm, GE mag-pickup, Heath tuner and amplifier 20 w., University 6201 speaker, $150 or communications rcvr. Will deliver N. Y., Conn., Pa. Bob Spinillo, 565 N. Coles Ave., Maple Shade, N. J.

SELL OR SWAP — Instrutograph code machine and 10 tapes, wind-up model with or without oscillator. Make offer (cash or trade). Charles E. Rich, Littlestown, Pa.

FOR SALE — Pentron 9T-3C tape recorder, $85; AC amprobe, model A6; AC Ranger 0-150-600 v., 0-10-25-50-100-250 amps, $35. William Hintz, Box 243, Hopkins, Minn.

FOR SALE — Precision sig. gen. E-200-C with instructions, probes, in original carton, $40; Solar exam-eter model CF, instruction, leads, original carton, $45; McMurdo Silver Vomax 900 VTVM, $25. Albert Lose, 201 Conroy Way, Tarentum, Pa.

SELL — Millen 90800 75 w. xmitter, completely shielded, filtered, operates with no TVI, tubes, coils for 40-20-10, factory instruction, clean, first $25. J. Cozzo, 1080 68th St., Brooklyn 19, N. Y.

SELL OR TRADE — 1 AX2, 12AY7, 12AL5 Raytheon tubes in original cartons. Need other TV tubes. Roy Goodwin, North Dr. R. 1, Ben Hill, Georgia.

FOR SALE — Prospector's new counters: 106B Lucky Strike, 107B Professional, 108 Snooper, Dual-Tube Geiger Counter. Make offer. Merton Marley, 2873 North Ave., Grand Junction, Colo.

SELL — Precise 635 audio gen., $25; Heathkit SG7 sig. gen., C2 condenser checker and T-2 signal tracer, $19.50 ea. E. A. Hudson, 113 Golf Ave., Mt. Rt. 7, Ellwood City, Pa.

WANTED — Set welding gauges, bases and torches. Trade 60" mobile whip, 10-11 meter Gonset with noise clipper, xmitter, parts, var. cond., tubes, etc. George Dvorak, Montgomery, Minn.

FOR SALE — Instructograph with 10 tapes and oscillator, exc. cond., $25; Supreme 385 diagonmeter, tube tester and set analyzer, $30; Sonar XE10 xmitter, $10. E. Tischler, 58 Carey Ave., Wilkes-Barre, Pa.

FOR SALE — Viking II xmitter and Viking VFO, $270; HQ-129X, $125. Franklin Thornton, R. 1, Easton, Pa.

FOR SALE — Complete Mark II transceiver, $35; RT/19 Arc and transceiver, no tubes, $15. All prices FOB. John G. Morrice, 57 Rockaway Ave., Rockaway, N. J.

SELL OR TRADE — 120 issues CQ and QST since 1950; also 100 issues PM, PS, etc. Need G-R or similar audio equip. Elliot Belin, 99 Harvard St., Dorchester 24, Mass.

FOR SALE — Riders manuals 1 thru 8 and 12. Best offer takes one or all. Ralph L. Hyland, Box 1681, Williamsburg, Va.

SELL OR TRADE — Radio and xmitter parts including 10" Crosley TV, pr. 833's. Prefer to sell all in one lot. John Darrow, 448 Grand, Galion, Ohio

FOR SALE — Hi-Fi Tech Master TM-15P preamp and TM-15A 20 w. amplifier, complete with cables, tubes, manuals, both, $55. Ed. Slusarski, 3520 W. 49th St., Cleveland 2, Ohio.

SELL OR TRADE — GE 3" 0-200 microamp meter, 270 degree reading, blank face, exc. cond. Tony Karp, 101-64 118th St., Richmond Hill 19, N. Y.

FOR SALE — 2 CREI courses: Specialized Radio Aeronautical Engineering and Broadcast Radio Engineering, 15 lessons, $8 each. Both for $15. Norman Niemiller, 230 Parade, St. Marys, Pa.

FOR SALE — Back issues of Audio Engineering, QST, CQ, Radio, Radio and Television News, Electronics, Tele-Tech, etc. E. P. Sadler, 398 Sigourney St., Hartford, Conn.

WANTED — Good used test equip. for Radio and TV shop: tube tester, VTVM, sig. gen., in A-1 shape and priced reasonable. Subject to insp. Richard Garcia, 119 E. Main St., Anadarko, Okla.

SELL OR TRADE — Ham radio gear, portable typewriter, for photo equip., camera, enlarger, projector, etc. R. A. Williams, 16153 3 Palms St., Puente, Calif.

TRADE — Eico 315 sig. gen. and electronic designs VTVM model 100 for Sprague TO-4 Tel-Ohmike. Also trade unused complete dynamotor PE-94-C for Sams TV folders. Frank Truskolaski, Box 493, Adena, Ohio.

SELL OR TRADE — 2 BC-645's one converted with power supply other as received in new cond. C. A. Lanham, 404 W. Union St., Bloomington, Ill.

TRADE — Hallicrafters 8R40 radio, Heathkit TS-2 sweep and marker gen., 8-tube '49 Studebaker car radio, all good cond. Want tape recorder or 4x5 press camera with coupled range finder and flash gun. John Simmons, 520½ 10th St., Alamosa, Colo.

WANTED — October 1941 issue of QST in good cond. C. Stouth 88-4 Ferne, Drexel Hill, Pa.

TRADE — Riders 1 thru 21 exc. cond.; El-Tronics SM-3 Geiger counter with new batteries; pair Handie-Talkies (SCR 536); unused tubes 4X150A; 4-65A; 100TH. Want Sams Photofacts, U. S. postage stamps, ham gear or what have you. Snow, 708 Chris Ave., Altus, Okla.

SWAP — 31" scale model of 50 ft. cabin cruiser, radio controlled complete with xmitter/rcvr. ready to operate for SX99 or equiv. Ned Varney, 14-15 Fifth St., Fairlawn, N. J.

FOR SALE — SG-6 sig. gen.; TS-3 marker and sweep gen.; 300 w. slide projector; lab. power supply; "Radio & TV Mathematics" book; 3" portable scope; multimeter; T-2 sig. tracer. Stanley Bombka, 8107 N. Odell Ave., Niles 31, Ill.

FOR SALE — Unused RCA WO-56A scope (cost $219.95) make offer; Hickok 191X sig. gen, perfect, $100; Philco 7052 dynamic mutual conductance tube checker, l. n., $95; Riders 6 and 8. Bud's Radio & TV, 5912 Hampton Ave., St. Louis, Mo.

FOR SALE — Rider chanalyst; RCA test oscillator; Triplett multimeter; Solar capacitor analyzer; many books and parts. Don Lear, 710 East 14th St., Davenport, Iowa.

FOR SALE — National NC-88 with S-meter in matching case, l. n., with instruction book. Best offer over $100, FOB. Gary Clifton, 802 Locust St., Neligh, Neb.

WANTED — Ham equip. or Olsen pointers in trade for paint sprayer, ¾, 1/3 hp. motors, phono motors, tubes, condensers, etc. A. Shaw, 1530 Grove, Burlington, Iowa.

FOR SALE — Precision ES500 scope with probes used 4 times, in original carton, $160; Precision E400 sweep gen. with cables, $75, never used. Ship COD. Precision Service Co. 937 Center St., Brockton 58, Mass.

WANTED — Receiver such as HQ129X, HQ140X, SX71 or 75A1. H. Pearle 130-13 227 St., Springfield Gardens 13, N. Y.

SELL — Antique receiving tubes, all nos., all tubes guaranteed, perf. cond. L. Long, 2518 Propst St., Gastonia, N. C.

WANTED — Key making or duplicating machine with blanks. Have TV sets, 10 to 20"; record changers, small radios, car radios, amplifiers, test equip. Troch's, 290 Main St., Spotswood, N. J.

FOR SALE — Edwards FM tuner, less cabinet, $10; xformer welder with leads, $15; RCA chanalyst, GE 3" scope, etc., cheap. R. Gasser, R. 10, Fort Wayne, Ind.

FOR SALE — HT18 VFO, $75 or best cash offer; Electronic keyer, $10. C. G. Stuart, 141 Whiting St., Toledo 9, Ohio.

WANTED — Hickok 650 C, used and in good cond. Send final cash price. Edward R. Dzeda, 54 N. Pleasant Ave., Niles, Ohio.

FOR SALE — Rider's TV manuals 3, 4, and 5, $32 plus shipping. H. M. Love, 20108 Detroit Rd., Rocky River 16, Ohio.

WANTED — Rider chanalyst or equivalent, in good cond. State lowest cash price. Morse's Radio Service, Box 544, Drumheller, Alberta, Can.

FOR SALE — National NC-88 rcvr., exc. cond. Best offer takes it. Willner, 1248 White Plains Rd., Bronx 72, N. Y.

FOR SALE — L. N. GE selsyns model 2J1F1, 30 or 60 v. 60 cycle, $5 per pair postpaid. D. E. Udey, 307 Highgate Rd., Ithaca, N. Y.

WANTED — Supreme video gen., state cond. and price. For sale: four unused BC type high power mica capacitors, .0025 ufd at 25 KV 22 amps., each $65. Al Benz, 1106 12th Ave., Seattle 22, Wash.

WANTED — Riders Radio manuals, NRI course in Electrical Appliance Training and Tester, last year's C-D Capacitors. P. V. Radio, Box 376, Armstrong, B. C.

FOR SALE — Pentron Emperor HF-400 2 speed tape recorder. Full width heads, 3 speakers, 1 month old, new cond., $195 plus shipping charges. Will include 5 reels of tape. P. Lazzio, Lake Geneva, Wis.

FOR SALE — $75 complete, need cash: 5" Eico 425 scope with probes, Eico 360 TV FM sweep gen. with 4½ - 5 mc. crystals. S. Reading, 13817 Jamaica Ave., Jamaica, N. Y.

FOR SALE — Riders manuals 1 to 13; professional amateur disc recording equip., l. n.; tape recorder, PA and musical instrument amplifiers, mikes. Want good scope (Magnecord, Ampex, or Concertone). John T. Moore, Box 63, Seneca, S. C.

FOR SALE — Precision 10-12P tube tester, one year old, little used, $80; Supreme 89D tubetester, volt and ohmmeter good, $5 FOB. G. E. Tripp, 1312 11 St., Rock Valley, Iowa.

WANTED — FM rcvr. to receive 38 mc. fixed frequency may be crystal controlled or tunable. Warren Police Department, Warren, Minn.

WANT — Instruction manual for Link FM xmitter type 25, No. 3127 and Link FM rcvr. No. 19162. H. H. Riley, Rt. 4, Box 346, Aiken, S. C.

SWAP — Spertie sun lamp, Wabash strobe, with rechargeable battery; Hallicrafters 7" TV; Multimeter; Weston photocells and microrelays; TV booster; chrome bug. L. Meister, 321 River Rd., Nutley, N. J.

FOR SALE — Mobile and home xmitter, 25 w.; Pierce 6C5 xtal oscillator 5881 RF; speech amp 6J7, 6C5 model 5881; Thordarson 25 w. multimatch xformer; coils for 80-40-20 National PiMatch network; heavy duty power supply, $50. R. N. Eubank, Box 9-231, Richmond 27, Va.

FOR SALE — Amateur, HiFi, and test equipment: Bogen 600 with two 60R remotes; Jensen H222 Coax. speaker; Herman-Kardan PC-200 amplifier, etc. Send for list. Richard Ebeling, 33 Randolph Rd., White Plains, N. Y.

FOR SALE — Precision E-400 sweep sig. gen. with xtals and leads, $75; Es-500 scope, $85, manuals included. Will deliver metropolitan area. A. R. Fasig, 3508 Ave. L, Brooklyn, 10, N. Y.

FOR SALE — Bassett-Chamberlain cabinet xmitter 200 w. CW and phone. Bruun Radio, 260 North Ave., Dunellen, N. J.

WANTED — Antenna 12 coil for band 2 for BC-669B (SCR-543-A) rcvr. in working cond. without metal can. James T. Schliestett, Box 28, Cedartown, Ga.

TRADE OR SELL — BC654A with PE103, cables, tech manual; 1500-1250-1000 v. at 300 ma. supply, tubes, variables, chokes, xformers; meters, 5" panel with 4 meters, 3½". Want BC-221, VTVM, or ? Emil Kalar, Box 221, So. International Falls, Minn.

SELL OR SWAP — Amperite Ribbon Microphone, high impedance, $15; Brush RC20 crystal record cutter, fits Rek-O-Kut professional lathes and others, $8. Want small TV set, FM tuner, test apparatus. Forrest Arnold, 90-05 175th St., Jamaica 32, N. Y.

FOR SALE — Globe Scout 40A xmitter; Millen R9'er, Knight 7 w. PA system, complete with speaker and case; Thordarson Muli-Match modulation xformer, 125 w. F. W. Jones, Gabbs, Nev.

FOR SALE — Riders manuals, exc., 1 thru 10, $5 each or $35 for lot FOB; Hickok 534, reasonable. T. P. Bossbach, 13941 Kentucky, Detroit, Mich.

FOR SALE — Superior TV-11 modified tube tester, $35. Art's Radio Fixit Shop, 207 Redmond St., New Brunswick, N. J.

FOR SALE — 360 Eico sweep gen., wired, including manuals and 4.5 mc. crystal, $34.95; Heath BG-1 bar gen., wired, manual, $10. K. C. Weis, 1427 Glencoe St., Denver, Colo.

WANTED — 98.356 crystal and transformer T-112 for BC-788-C and tech. manual for ID60/APA-10. Give price and cond. Lewis H. Myers, 404 Lexington Drive, Silver Spring, Md.

FOR SALE — BC-314 long-wave receiver, exc. cond., $50 postpaid. Charles W. Leigh, 162 Passaic St., Trenton 8, N. J.

SWAP — Professional 107B Precision geiger counter in exc. cond., for a portable Wheatstone bridge—Leeds & Northrup, Gray Instrument or Shallcross, or GR inductance bridge. Herbert J. Hoover, 2047 North Parker Ave., Indianapolis 18, Ind.

FOR SALE — Almost new Heathkit DX-100 transmitter, neatly wired, $190 plus shipping charges. Might trade for Hi-Fi equip. Hubert M. Custer, Elizabethtown College, Elizabethtown, Pa.

WANT — General Radio precision wavemeter, prefer model 724B; Weston 665 type 2 analyser manual; Sky Ranger S-39 for parts; 100 NE chest. Sprague TO-3 Tel-Ohmike, $40, for sale. W. E. Schwenzer, 3619 Peach St., Erie, Pa.

FOR SALE — Pair SCR-536 Handie Talkies on 3885 kc., good working order, $125. Cecil Thomas, 11840 Renton Avenue, Seattle 88, Wash.

FOR SALE — Simpson 480 Genescope, like new, with cables, probe, instruction manual, sacrifice, $250. S. Rand, 27 Forest Ave., Ossining, N. Y.

SELL OR SWAP — Heath sweep gen., $25; Heath sig. gen., $18; Solar condenser tester, $12; good car radios, $4 each. Postage paid. Al Pratt, 114 West Lakeview, Milwaukee 17, Wis.

FOR SALE — Simpson 351 TV antenna compass, $9; Superior VOM 12-range selector with leads in case, $5; Carron BFO continuous 20-16,000 cycles, $14; Webster 78 changer 56-1. W. B. Sanford, 560 Walnut St., Fall River, Mass.

FOR SALE — Simpson 260 meter, like new. Albert Shernov, 250 East 176th St., New York 57, N. Y.

FOR SALE — Meissner 8-C FM tuner, 88-108 mc., perfect cond., $35. J. J. Cermak, 542 Woodside, Hinsdale, Ill.

FOR SALE — Johnson kw. Matchbox in original carton, $115 prepaid. Calvin J. Evans, 327 W. Spring St., LaGrange, Ind.

FOR SALE — Radio News, Sept. '44 to Dec. '54 (Engineering Edition after June 1950), exc. cond., $20 plus shipping; Astounding Science Fiction, '44 - '53, make offer. Arthur J. Katz, 180 Davey St., Bloomfield, N. J.

FOR SALE — Pickering 132E record compensator, hardly used, $5 FOB. Fred Wittich, 7202 Juniper Valley Rd., Middle Village, N. Y.

FOR SALE — 40 sets Standard coil UHF strips for Channel 25; 3 sets Zenith Channel 25. Tunes to 23 or 27. $2.50 per set, or bid for lot. R. I. Beale, 6645 SW 73 Court, Miami 43, Fla.

SELL OR TRADE — 110 v. - 273 ma. DC generator; Carter Dynamotor 4228VS; Motorola FMTU 30D with tubes less power supply. Need '55 Pontiac auto radio or 12 v. mobile power supply. Henry A. Galbraith, 1214 South Alvord Boulevard, Evansville 14, Ind.

FOR SALE — National NC-98 amateur receiver, matching speaker, instruction manual, like new, $100 FOB. Veto M. Twaska, 3105 Bergman St., Pittsburgh 4, Pa.

WANTED — 100 w. all-band transmitter, or TR75 TV transmitter. State price and cond. John Gubernard, 21 Arverne Terr., Irvington 11, N. J.

SELL — CRO-2 Jackson scope, $169; TVG-1 Jackson sig. gen., $159; WRL Globe Scout 65A transmitter, $79. All are in factory new cond. L. F. Kirkman, 2444 D St., Lincoln 2, Neb.

FOR SALE — Famous custom-built Scott Hi-Fi radio-combination, extra large mahogany cabinet, 24 tubes, record player out of order, otherwise fine cond. Sell to highest bidder. George P. Shears, Huntingburg, Ind.

FOR SALE — Regency RC-600 UHF converter, A-1 cond., tested, with factory warranty, in original carton, $20 postpaid. Send money order for deposit exam. Edward Becker, 254 Niagara Falls Blvd., Buffalo 23, N. Y.

WANTED — Signal supply catalog, Sig 5, either complete or any. Tom Allen, 159 Carlton Ave., Brooklyn 5, N. Y.

WANTED — Motor generator set 1000 to 1200 w., 60 cy., 120 v., direct drive, in good cond., priced reasonable. William Martin, 1531 Catalpa St., Louisville 11, Ky.

FOR SALE — 80 foot triangular guyed tower with aluminum base plate, cheap. C. Remick, 7 Elizabeth Pkwy., Eatontown, N. J.

FOR SALE — Eico tube tester, factory wired, $40.95 postpaid. Money order only. Cutler TV, 1954 Unionport Rd., New York 62, N. Y.

FOR SALE — Refractor Astromical Telescope, lens, 6 ft. tripod, 30-picture chart, telescope, and finder telescope, $15 plus postage. William Brasie, 420 Adams St., Owosso, Mich.

WANT — ART-13, ARN-7, ARC-1, CU-25, BC-342, BC-312 for cash or trade for new NC-300, PRO-310, SX-100, Fisher Hi-Fi, Pentron, Bell. Alltronics, Box 19, Boston 1, Mass.

WANTED — Small fone xmitter, have National steel guitar, built-in magnetic pickup and orchestra amplifier. Thomas E. Hardy, Box 84, Hardy, Ark.

WANTED — Circuit diagram for Ranger 6-tube radio, by Brown & Manhart; Emerson BD 197 table radio; Riders Vols. 1 and 2. C. E. Peters, 2925 Apple St., Lincoln 3, Neb.

WANTED — Riders Volume 18. H. E. Williams, 1805 - 17th St., NE, Canton 5, Ohio.

WANTED — Surplus tubes, Sams Photofacts, all kinds condensers and controls. State full details first letter. R. Trinka, 815 Central, Hamilton, Ohio.

WANTED — Riders manuals, late Riders Index, Sams Photofact folders, radio tech. books. Must be in good cond. L. S. Mueller, 4228 Bozeman St., Seattle 18, Wash.

FOR SALE — Oak Ridge instruments with carrying case and leads in exc. cond.: model 101 substitution tester, model 103 sig. generator, model 104 syncro sweep generator and model 106 CRI tester. $65 for the lot. 2Alex M. Remer, 1175 Gerard Ave., New York 52, N. Y.

FOR SALE — QST 1941 thru '50; IRE 1945 thru '52; Elec. Engr'g 1947 thru 1952; Radio TV News 1948 thru '52; exc. cond. Want type AC coil for HRO 50T1. J. P. Andrasko, 223 East 96th St., New York 28, N. Y.

SELL OR SWAP — Large quantity precision resistors, all like new, WW and deposited carbon, mostly 1%. Lawrence Critchlow, Pearl River TV, Pearl River, N. Y.

FOR SALE — Viking II, VFO and low-pass filter; SX-25 rcvr. (needs output transformer). $300 plus shipping. L. Helpern, 3611 206th St., Bayside 61, N. Y.

FOR SALE — Central Electronics reactivator, tester, CRT, model RE-1, $45; C-D BF-90 in-circuit capacitor checker, $25, plus shipping. IKE's Radio-TV, 6655 Main St., Cass City, Mich.

SELL OR TRADE — Supreme model 189 sig. gen.; Variac 500 mil Thordarson choke; Eimac vacuum condenser; deluxe McElroy bug. Want U.S. stamps, Ballentine or Heathkit model AV-2 AC VTVM, FM tuner. J. Durant, 3268 47th St., Sandia Base, Albuquerque, N. M.

WANTED — Schematic or information on Recordall model HF, serial No. 501, made by Recordall Mfg. Company, Los Angeles, May 1940. H. R. Ringold, 132 W. Doheny Dr., Beverly Hills, Calif.

SWAP — Riders Vol. 11, Elements of Radio Servicing by Marcus and Levy, TV Tube Location Guide TGL-4, Mallory-Taxly Radio Service Encyclopedia, NRI Radio course without parts. Want books on watch repairing. What have you? H. R. Bailey, Box 296, Drayton, S. C.

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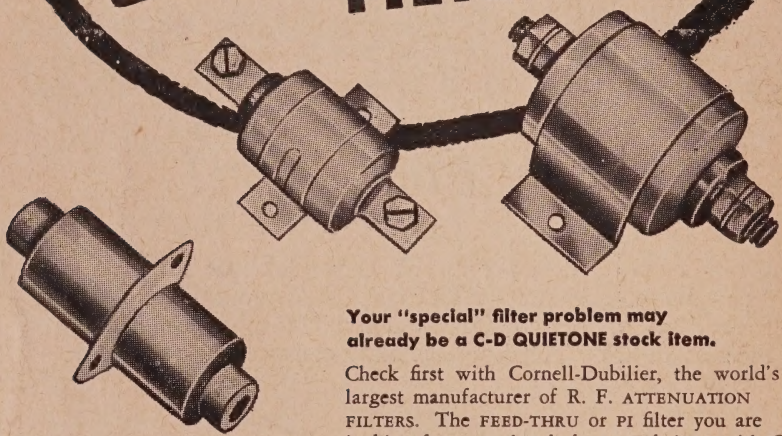

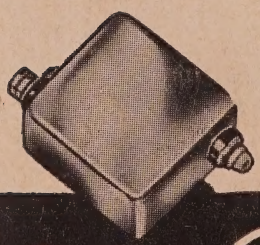

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